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EFFECT OF A SALES CONFIGURATOR ON SALES WORK

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Abstract: Configurators are essential tools in mass customization. Sales configurators, used in sales work to assist sales personnel and customers to define the product configuration, have also an influence on how sales work can be organized. The knowledge domain level, where configuration is conducted, affects the knowledge requirements placed on sales staff, focus of attention in sales situation, organizing possibilities of sales function, and complexity of configurator construction and maintenance. In this paper, we will evaluate three alternatives for sales configurators, namely structure focused, feature focused, and performance focused sales configurators, in B2B environment and each alternative's effect on sales work.

Key Words: Sales configurator, sales work, knowledge, mass customization

1. INTRODUCTION

Mass customization is advocated as an answer to the turbulence that has splintered the mass market. With constant technological innovations the product lifecycles have become shorter and individual wants and needs of any one customer are also more and more prone to changes and shifts [1]. Mass customization is also considered a viable strategy for industrial markets and for companies with background in customized production [2], although the label Mass Customization is not well-established in the industrial community yet [3]. Mass customization has also been noted a promising approach in emerging markets in which low resources usage in product development and frugal innovations are needed [4]. Low cost customized products are still a new phenomenon in a customer-centered marketplace [2].

Before mass customization, companies chose to produce either large volume of standardized goods at low cost, or customized or highly differentiated products in smaller volumes at a high cost [5]. Consequently, mass customization presents a paradox by combining customization and mass production, offering unique products in a mass-produced, low cost, high volume production environment [2].

As in [6], the genus of mass customization is the customer co-design process. Customers are invited to participate in value creation process by defining, configuring, matching, or modifying an individual solution, inside a large but fixed solution space. The customer interaction process itself has to create appreciated value for the customer, but at the same time, it has to be cost-efficient to enable relative low operation costs. Product configuration systems are considered to be the most important enablers of the mass customization strategy [7].

The high product variety of a mass customization strategy induces a high level of complexity both from the mass customizer's perspective as well as from the customers' viewpoint [8]. Sales configurators are considered as an efficient way to represent this large amount of variety for the customer without causing "mass confusion". If consumer is offered too large assortment to choose from the complexity of selection can cause an information overload and lead to not choosing at all [9, 10]. Instead of offering a customer a list of 5.000 products or even more, right product for the customer is defined by a structured process of selections.

Most of the literature on sales configurators is focused on consumer business and their suggestions and results conforms this focus. A lot of focus is placed on usability of configurators, and how well they foster customer learning about product features and qualities. Also, web-based sales configurators are usually also ordering systems and they need to support the whole product definition and order process. However, in capital goods industries the user of a sales configurator is most often a professional sales person [11] and the sales configurator's role is as a professional tool to assist the sales person in the customer interface. Thus, sales people are a fundamental component of the configurator system [12].

According to [13], past research on mass customization has been almost exclusively focused on identifying and formalizing methods (e.g. techniques, process structures, organizational arrangements and technologies) to effectively customize products and services. However, mass customization is not a simple strategy to undertake organizationally [1]. Implementing mass customization requires a more comprehensive approach, including organizational factors such as management. change organizational learning, commitment and creativity [11]. Turning mass customization methods, e.g. product configuration, to mass customization capability requires seamless compatibility of tools, capabilities and management practices. Also, knowledge on how to integrate configuration systems from an organizational point of view in an existing sales system is more or less lacking [6].

This paper seeks to tackle this shortcoming in extant literature by focusing on organizational arrangements that different types of sales configurators enable and require. Special focus is laid on different types of configurators, or on sales configurators' configurations, and how each support and influence the sales work. Especially knowledge requirements, focus of the sales work and organizational arrangement (e.g. use of leased sales personnel or a dealer network) are evaluated.

This study was initiated based on assignment from one large global company manufacturing capital goods. The main research methods is a conceptual-analytical research method based on existing literature, supported by interviews conducted in the aforementioned company and general knowledge and experience of authors in capital goods industry.

The rest of the paper is structured as follows. In Section 2, organization of sales work in large global manufacturing companies is elaborated and the role of sales people from the knowledge process point of view. In Section 3, the significance of sales work is evaluated from perspective of networked value system continuum. In Section 4, the different types of sales configurators are discussed. In Section 5, different configurations of sales configurators are reflected to knowledge requirements and possible organizational arrangements. In Section 6, the paper is finished with conclusions, limitations and future research recommendations.

2. ORGANIZING THE SALES WORK AS A INTERACTIVE KNOWLEDGE PROCESS

Capital goods industry differs from consumer businesses in numerous of ways. First, amount of customers are usually smaller and relationship to them is tighter by nature. Secondly, B2B customer are considered being more rational buyers seeking optimal balance between product qualities, price and delivery time/accuracy. And thirdly, many times the industrial buyer is an expert of customer domain and possesses high level of requirements and product related knowledge.

Typically product offerings of companies offering capital goods span over standard products, mass customized products, and products requiring order engineering or even new product development. Many companies seek to become a solution provider supplying the customer everything they need for certain purpose and even more, counseling and guiding the customer on how to improve their operations with supplier's products and services. In addition to products, the MRO and lifecycle services have become increasingly important part of income. Also, many suppliers seeks to integrate into the customer's processes even more deeply offering intangible services, new kind of value added offerings, and improving the customer's own operations. This requires high level of interaction and expertise from sales force.

In global markets the sales are usually organized as twofold: internal sales support (order engineering, cost calculations, delivery time) representing the 'factory' and external sales (customer interaction, CRM, pricing decision) which might consist of company's own sales units in main market areas, and dealer networks and independent representatives in other market areas. This kind of organizing of sales presents some challenges since the knowledge level of different sales people is not equal. A representative might have multiple suppliers from different product groups and the product expertise can not be at the same level as within own specialized Generally, dealer networks sales units. and representatives need more product support from internal sales support or from nearest internal sales unit. Knowledge support will not happen evolutionary while mass customization should be strategically governed in intentionally organized business nets including network members from different organizations.



Figure 1.Two-phased configuration process

Typical product definition process consists of two phases. First, definition of sales structure is conducted in joint effort of sales people and customer. Level of product definition in this phase can range from itemlevel definition of a product structure to an abstract level definition of product performance capabilities. Even if the product is defined in the item level usually the defined items in this phase are main level items that encompass their own component level items. In the second phase the sales structure for procurement and production. In this study, only the first definition process between sales people and customers is in the focus.

The sales work can be seen as a knowledge process where a sales person matches the customer need to available solutions. The process is about managing knowledge across knowledge domain borders, the customers' knowledge domain and the suppliers knowledge domain. High level of product knowledge is assumed from sales force, because of highly informed and knowledgeable customers. This requirement leads to difficulties in utilizing leased workforce for the peak seasons. Usually sales people in capital goods industry have an educational background in engineering. On the other hand, so has the buyer, who might have a solid understanding of fine-tuned technical requirements for the product putting even more pressure for expertise of the sales people.



Figure 2. Crossover of the knowledge sets

Common knowledge set is required for sales person and customer for being able to interact and jointly define the product's sales configuration. In theoretical minimum, this means a common language, e.g. English and some basic understanding on object of interaction, the product definition. Larger the common knowledge set is, less border crossing between knowledge sets is needed and simpler the configuration process is. If the common knowledge set is thin, more complex the product configuration process become and more border crossing is needed between customer's and supplier's knowledge sets.

In the industrial management literature it is suggested that supplier should be responsible for this border crossing, not the customer. Supplier should seek to learn from customer's environment and integrate into their business in an extent that they can suggest improvements for their customers [14]. If the customer is left with the responsibility to cross the knowledge border and learn a lot about product qualities, technical details etc., customer sacrifice becomes high and might lead to uncertainty and dissatisfaction.



Figure 3. Knowledge boundaries (adopted from [15])

According to [15], crossing the knowledge borders can be done in three levels depending on novelty of the boundary that has to be crossed: transferring, translating or transforming knowledge. If the common knowledge is readily sufficient, the product definition process is simple transfer of customer requirements for production. This require encoded knowledge i.e. the product data and relationships that are well-defined and even rule-based. If some novelty emerges in the product definition process, e.g. it is not obvious which product options fulfill customer requirements a translation of meanings is required. This might require explicating embedded knowledge in products, e.g. performance and qualities that certain features contain, and in customer environment. When novelty of interaction or object of interaction increases even more, difficulties rise in the product definition process. Translation of domain specific knowledge is not enough anymore, but knowledge has to be transformed to differed domain. It demands two-sided co-creation, creation of encultured knowledge to achieve shared understanding. As a result of transformation customer understands the extent of performance and qualities achievable with product and supplier is able to define nearest match of available offerings and to better understand the actual customer need, perhaps requiring development of new product features or even new solutions. Depending on sales staff expertise of the customer domain, or vice versa, the interaction require one of these border crossing activities.

In addition to sales process, sales people have a central role in product and service innovations. They are in direct contact with the customers and can learn from customer domain and requirements and identify new or enhanced business opportunities for value creation.

Production facilities and R&D units, on the other hand, are usually located quite far from customer, even in different continents. Since the direct spatial proximity is usually quite big, they have to rely mostly on explicit knowledge gathered via different information systems, e.g. configurators or CRM-systems. Thus, the design of configurators is crucial not only for fast, error free and cost-efficient sales process but also for innovation process.

information received However, through а configurator only concerns the existing innovation and the fixed solution space to customize that innovation. Thus, mass customization concentrates on customization of existing innovations and incremental improvement whereas the most rewarding customer involvement could be shown in the ideating process of new products [16]. Sales people are in a key position in acquiring customer knowledge since they are spread all over the world close to customer locations. This spatial proximity alleviates face-to-face-meetings and thereby the exchange of tacit knowledge, critical for new innovations [3].

Collecting customer knowledge and sharing it inside the company and in key collaboration networks support customer centric innovation, regarded as a mean for achieving competitive advantage [17]. Learning is critical in this process which requires mutual understanding and co-creation of knowledge [18].

3. ANCHORING SALES WORK TO NETWORKED KNOWLEDGE PROCESS

In the intentionally organized business net context value and knowledge creation needs understanding of different kind of business nets [19]. They define them coalitions of autonomous but interdependent firms that are willing to coordinate some of their actions and sometimes even to submit part of their activities and decision domains to centralized control in order to achieve benefits that are greater than any single member of the net can create independently. There are three different kinds of business nets in value-system continuum: first; "current business nets" i.e. clearlyspecified and relatively stable and operationally oriented systems. These business nets are often operationally well-designed and efficient knowledge transferring systems (such as IKEA or Dell); secondly "business renewal nets" which evolve and are coordinated through incremental steps in this value-creation system. These nets try to follow continuous improvement in the specified business environment context (such as Nokia). These business nets are well determined and exploiting current knowledge, but also putting resources for new knowledge exploration; and thirdly "emerging new business nets" which are aiming at radical changes in value creation eco-systems (such as Apple, Google with many of the start-up companies). These emerging business nets are complex and act in constantly changing business and technology environment.

Sales, configuration, product design, manufacturing and delivery is formatted usually in a business net context. Sales people are also important source of ideas and markets needs in significant level for company's R&D. They have the first hand contact to customers and can learn from customer needs beyond current offerings. This requires systematic utilization of this knowledge form being able to capture new and emerging customer needs and for being able to respond and even predict. Mass customization through configuration follows many of the knowledge and value creation system rules of business renewal nets. Previously we have argued that following certain mass customization through knowledge creation can lead to standardization and even mass production of certain products. This is well in line with making "current business nets" -system. Thinking in the other way emerging business nets include quite often pure customization i.e. making unique products such as prototypes to test their market and customer value. In the middle we can follow "business renewal net" -approach in which limits of solution space are defined.

The role of communities of practice [20, 21]) is important to understand when using congiuration-based mass customization in business renewal nets. In [19] it was noted that: "being able to understand specialized knowledge domains as exemplified by experts of product and process technologies, software developers, marketing and business managers presumes an ability to cross their professional languages and sub-cultures". Well-designed configuration system can represent this kind of sphere of jointly held knowledge that offers mutual views to different members of configuration community of practice.

4. SALES CONFIGURATORS

The main distinctive principle of mass customization is a mechanism for interacting with the customer and obtaining specific information in order to define and translate the customer's needs and desires into a concrete product or service specification [22]. Thus, mass customization often requires a mechanism enabling elaboration of customer requirements, e.g. a configurator [23]. The success of such an interaction system is, however, by no means not only defined by its technological capabilities, but also by its integration in the whole sale environment, its ability to allow for learning by doing, to provide experience and process satisfaction, and its integration into the brand concept [22].

Configurators provide choice navigation support by helping in defining a sales specification that can be produced, and subsequently translated into the required parts and production information [24]. Sales configurators are used both to demonstrate product qualities for customers and in order entry to collect all needed product attributes systematically and in a digital form right from the start [11]. The result is a system of co-production, i.e. a manufacturer-customer interaction and adaptation for the purpose of attaining added value [22]. Essential is that the customer is integrated into the value creation of the supplier with a configurator.

In a multiple case study of 37 companies in capital goods industry [11], a typical product configuration process was conducted by a salesperson together with a customer, never by a customer on his own. However, the role of salespersons varied from simple entering of the customer requirements into the sales configurator to creative problem solving of a product expert.

The design of a sales configurator can vary significantly depending on the context it is implemented in. The difficulty of eliciting customer-specific information varies with the information required [23]. If only simple customization is offered the configurator might very simple and easy to use. In capital goods industry the customization more often than not, goes to structural level with specific materials, dimensions and/or performance requirements. Increasing complexity of product configurator process might also require more from the configurator solution.

From the knowledge point of view, the key question is the division of labor between sales confgurator and sales personnel, how much knowledge is modeled on the configurator system and how much the configuration process lean on sales personnel. What role the tool has in sales process? A configurator system can be defined as a socio-technical system, whose optimization requires the combined optimization of the human and computing subsystems [12].

Creating a configuration system with high level of configuration knowledge requires substantial modeling effort to construct and to maintain the sales configurator, requiring high level knowledge from those maintaining and updating configuration models in the system, e.g. best product experts. On the other hand, if the configurator supports high level definition of product, less expertise is needed from sales personnel. And vice versa, sales configurator with simple configuration knowledge only supports the sales process as an electronic order form, requiring high level of expertise from sales personnel during the production definition process but only a basic understanding from product configuration definition and maintenance team.

In [25] configurators were divided according to what support they provide for the user. In [25] it was distinguished between primitive, interactive and automatic configurators .Primitive configurators are most simple configurators, a system that merely records the configuration decisions made by the user. The system can not check that the decisions are valid with respect to each other. Interactive configurators on the other hand, can check the validity of each selection and to guide the user to make all necessary decisions. Automatic configurator offer full support for configuration task. On the basis of customer requirements, it can generate parts or even the entire configuration automatically.

Although usable classification of configurators, from knowledge perspective the most important classification criteria is in which knowledge domain the configuration process is conducted. Configurator's support for user is highly related issue, but rather a corollary issue following the configuration domain issue. As we can see in the Figure 1, there are three distinct knowledge domains that focus on different aspects of the product. Production is mostly interested in product structure and manufacturing, e.g. what parts should be its manufactured and what parts to ordered from suppliers, how to assemble the product, test it and other technical issues. Sales to support production information requirements need to identify and define the product structure to be manufactured. A configurator supporting the identification of product structure can include merely the main product item alternatives, or for critical components a more detailed level of items, to choose from. Automation for checking the validity of selections can be included, but the configuration process is conducted on item level. We call these as structure configurators.

Second knowledge domain is that one of sales people themselves. In their selling and marketing activities, they concentrate on product's features, attributes, qualities and functionality to distinguish the product or bundled product from its rivals. This, the most typical level of product configuration is conducted through product features, which are then linked to product structure fulfilling the selected features. Configuration might also include additional product related services, as some recent findings suggest [24]. We call these as **feature configurators**.

The third and final knowledge domain is the customer context where the product is used. Customer has a certain need that calls in for a solution that offered product has potential to fulfill partly or in whole. It might be customer's operational environment that requires enhancement or produced product that requires a part or module to support customer's customers. Customer is more interested on effects that can be achieved through using the product, the performance gain instead of its inherent features or technical structure which are secondary. A configurator constructed for customer domain knowledge collects information of customer environment and performance requirements, matches those needs to product features available and links it to product structure fulfilling those features. We call these as performance configurators.

Each type of configurator has its strengths and weaknesses and depending on context variables, such as customer preferences, organizational aspects, or complexity of the product, one of these might be preferable.

5. EFFECT OF SALES CONFIGURATOR'S CONFIGURATION ON SALES WORK

Marketing/sales function is globally most influenced by mass customization and require a wide, difficult-toacquire spectrum of competences [13]. Sales configurators and other CRM and sales tools have a great impact on sales force, how the work can be organized and what competences are needed.

In [13] a study was conducted on HRM policies associated with mass customization in five European countries and found that globally the commercial function represents 41% of the total training needs when introducing mass customization in organization. Since the evident importance, we concentrate on evaluating how different type of configurators affects to sales work.

A. Structure focused sales configurators

Structure configurators are the simplest type of configurators and resemble electronic product catalogues. Their most important contribution is that they enable the electronic collection of customer selections and digital transfer of orders for order handling, but support for sales process is minimal. The sales representative is left with the responsibility to interact with the customer for the configuration process and identification of appropriate items. Sales people should have high level technical understanding about the product for being able to match customer requirements to product structure and individual items. Also, if the configurator doesn't support for automated conflict inspection, the sales people should also understand interdependencies between different items. Otherwise an 'illegal' configuration might proceed to order handling causing time-consuming iterations with order handling, sales person and the customer and leading to poor customer experience.

The construction and implementation of structure configurators is easy in the first phase, but might lead to missing some of new suggestions and customer needs. The configurator merely collects the selected items and product structure for production from offered alternatives. It provides no support at all for identification of needs nor fully supported by selectable items or totally new needs.

Structure configurators put the pressure on high level product knowledge requirements of sales people, focus the attention on product configuration process in the sales situation, and might cause delays in order handling, but are most simple ones to construct and maintain.

B. Feature focused sales configurators

Feature configurators are more advanced in their support for sales configuration. They include two-phased configuration process where first phase is conducted on product features, the most familiar configuration level for sales people. Second phase is subordinate for the first phase and merely link the product structure fulfilling the selected features. Yet, they too enable not only the collection of customer preferences, options and selections but also help the customer or sales representative in the configuration process. Feature configurator might automatically checks the validity of selected preferences and options and can guide to change other selections if an incompatible selection is wished to be selected.

Feature configurator offers a lot more support for sales person and requires less product expertise from sales person. It also frees the time of seller from complex product definition process to more interactive and discursive relationship with the customer. It on the other hand enables easier use of leased sales personnel, or more focused concentrations on CRM and R&D input collection.

The construction and implementation of feature configurators is little more complex because of two level configurations that need to be linked to each other, but they support better the collection of customer preferences, yet, inside the offered alternatives. Configurator might not provide enough support for identification of actual customer needs not fully supported by offered product features. The sales people are in a key position to match the customer needs to offered product features.

Feature configurators put the pressure on medium level product knowledge requirements of sales people and focus the attention on 'customer need' – 'available product feature' -matching process in the sales situation. The two level configuration process might not be easy to construct and maintain because of need to translate the product features to product structure, and because of interdependencies between these two configuration levels, but makes it more easier to maintain the individual levels of configuration. In the capital goods industry, where delivery times might sometimes be even years, feature level configuration does not yet tie supplier's hands to certain commercial items, which enable easier product version changes during the delivery process.

C. Performance focused sales configurators

Performance configurators are the most complex and easiest to use type of configurators. In the configuration process they concentrate on collecting directly customer requirements and parameters instead of directly choosing product features or items. In the three level configuration process the inbuilt logic transforms the customer parameters to product features which then are translated to item structure and transferred for production.

In a way, requirements for the sales people are smallest since the customers can use their own language and remain in their own knowledge domain when defining their needs. Also, the configurator enables direct collection of information about customer environment and needs, an immerse value for R&D.

The construction and implementation of performance configurators is far more complex because of three level configurations process in which each step need to be linked to each other. Also, transforming the customer requirement to product features might not be straightforward process but rather a matching process for finding a closest match. Difficulties are also caused by ill-structured requirements difficult for configurator to process and thus, some knowledge and knowledge transformation is still left for the sales people. But they support in a fine way the collection of actual customer preferences and need as well as information of customer context.

Performance configurators put least pressure on product knowledge requirements of sales people and focus the attention on elaborating the customer need and to relationship management. The three level configuration process might be difficult to construct and maintain because of complex inderdependencies between configurators levels. However, performance configurators suggest more concentration on true customer needs and to finding optimal total solutions for customer (and not just defining the product of best match), fostering innovation.

6. CONCLUSION

Sales configurators are an important, but not the only tool to gather knowledge on customer preferences. It is important to integrate sales configurator to other important information systems, such as CRM, since in current cross-channel service models customer may use many parallel channels like telephone, internet, extranet, e-mail, or office visit, and the enterprise must in every case have an ability to offer equal service to customers and track service contacts regardless of channel [26]. Also the cross-channel service model, using different channels to interact customers, has been identified as an important factor.

Different types of configurators have even significant level effects on sales work, how it can be organized, what role sales people have in the product definition process and what knowledge requirements are placed on them. More advanced level of configurators are harder to construct, implement and maintain, but they require less product knowledge from sales people and might therefore enable more flexible use of sales force, e.g. leased workforce, representatives, and dealers.

The knowledge perspective was assumed as the most important issue in this paper affecting the sales configurator design decision. The division of knowledge work between sales configurator and sales people was considered as an essential question having deep effect on sales work and to organization even more generally. Question is not only about how to organize the sales work but also about what role the sales work has in the organization. Is it merely half external department taking in customer orders or does they have a premier role closest to the customer?

More over, sales configurators affect the organization innovation process by supporting it or hindering it. Performance focused sales configurators gather more valuable information for innovation process and frees sales people time and attention to listening the customer and paying attention to customer context. It would be expected to be the most innovation inspiring type of configurator, but again, depending on the contextual factors. Also, since sales configurator is only one sales system in addition traditional sales tools and CRMsystems, their effect is difficult to estimate in isolation. Other sales tools might provide even better support for innovation than performance focused sales configurator ever can.

Coming back to well-defined operational "current business nets" you need to be strategically safe in applying operational, even Six Sigma or any other quality managed supply chain. In these nets almost every piece of knowledge is defined and you can automate those (for example with performance sales configurators). However, if customer environment changes and provides a totally new playground for the business, it takes time to sense and respond to those changes.

In emerging business nets it is safer to rely on human expertise and joint learning of sales, product, manufacturing and delivery staff. In those nets, rich structural sales configurators might be the safest, however latest industrial social media tools have provided a new supplementary avenue for this kind of sales expertise. With social media you can deliver your experience to the whole supply and production chain, if the organization is ready to learn this new learning aspect.

As we said previously, business renewal nets both exploit and use the previous, well-defined knowledge to transfer and translate knowledge through the supply and production chain and try to explore new features for the next product and customer solutions. Balance of these two knowledge processes is critical. Therefore, it seems that the most suitable area of developing sales configurators, is feature focused sales configurators. Sales people are the most promising for sharing their experience and knowledge, for example with social media tools. However, the general problem of these social chats and discussion forums has been that engineers need to have much more analytical knowledge to understand the need for the new customer solution

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